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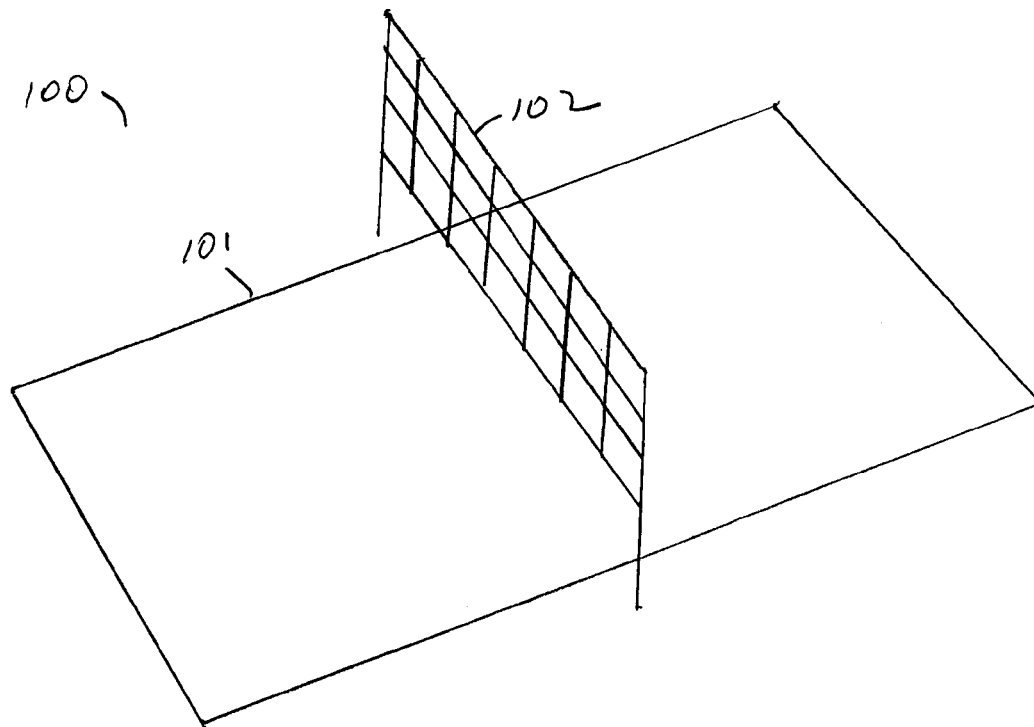


FIG. 1

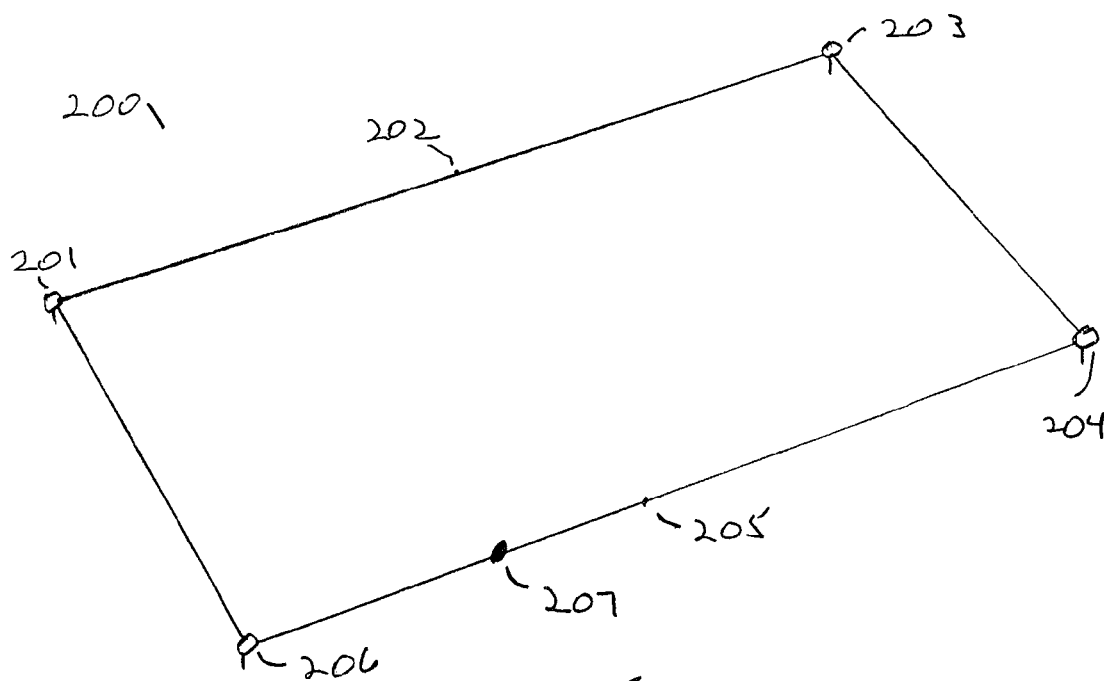


FIG. 2

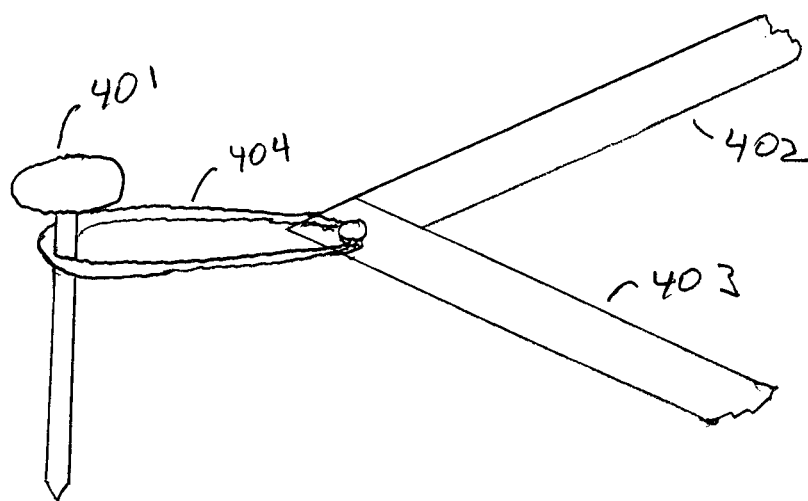
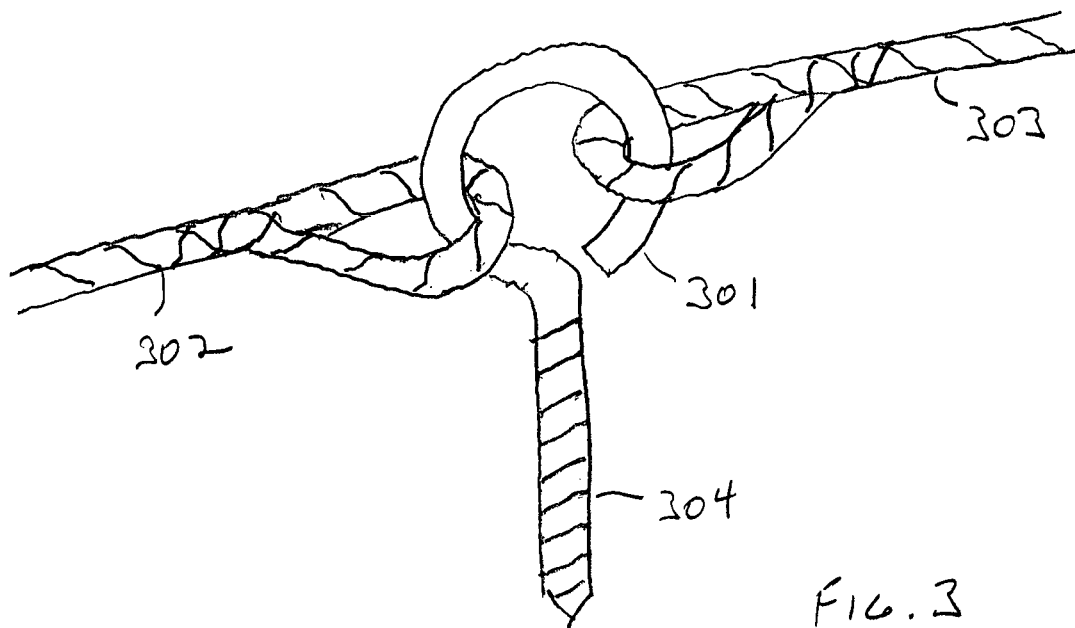


FIG. 4

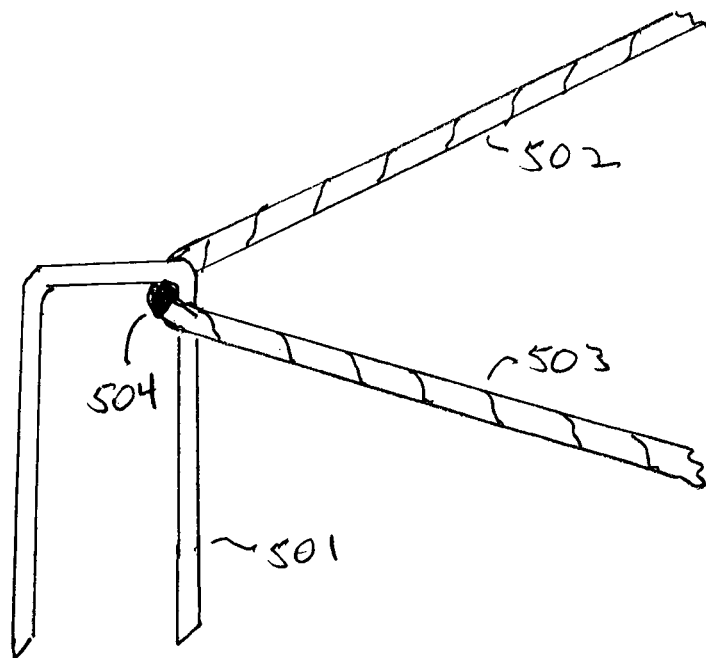


FIG. 5

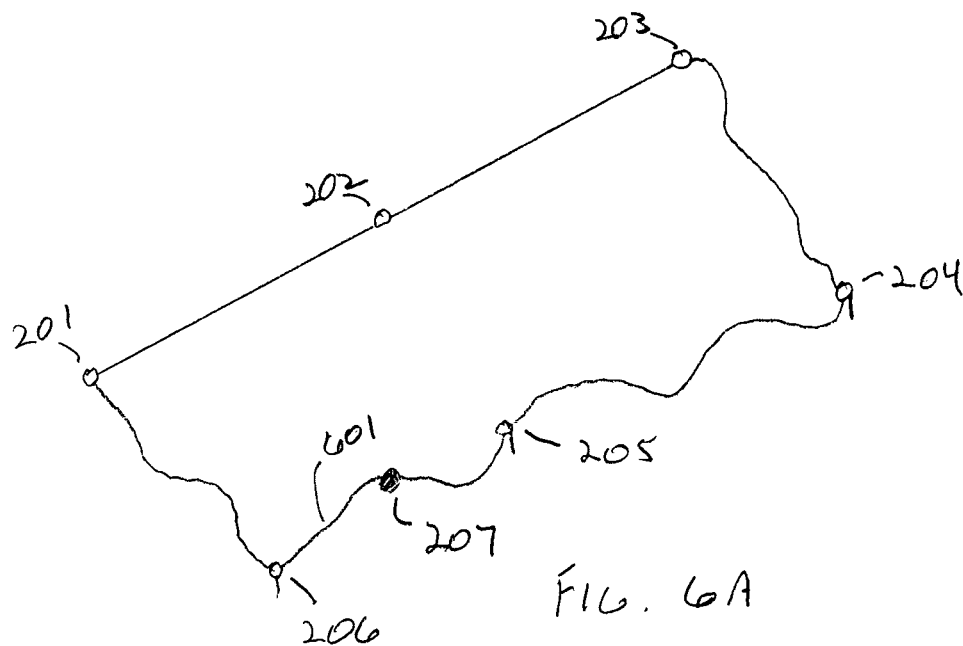


FIG. 6A

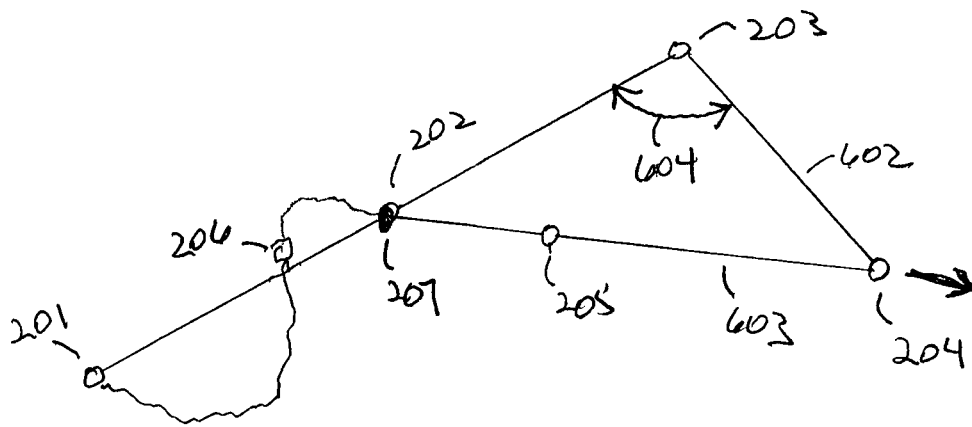


FIG. 6B

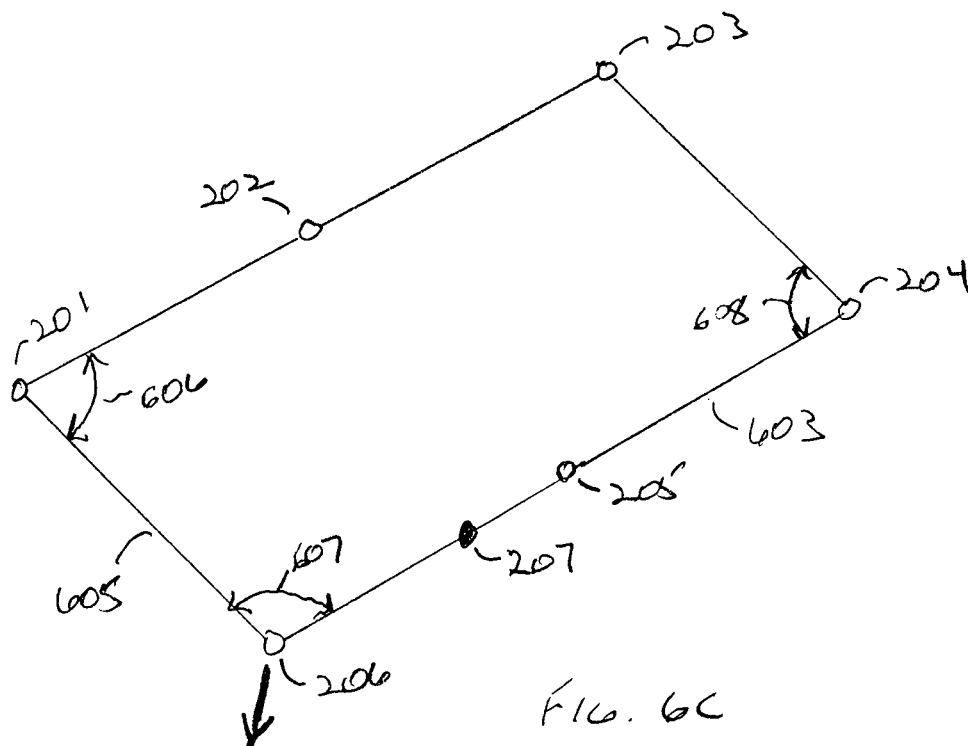


FIG. 6C

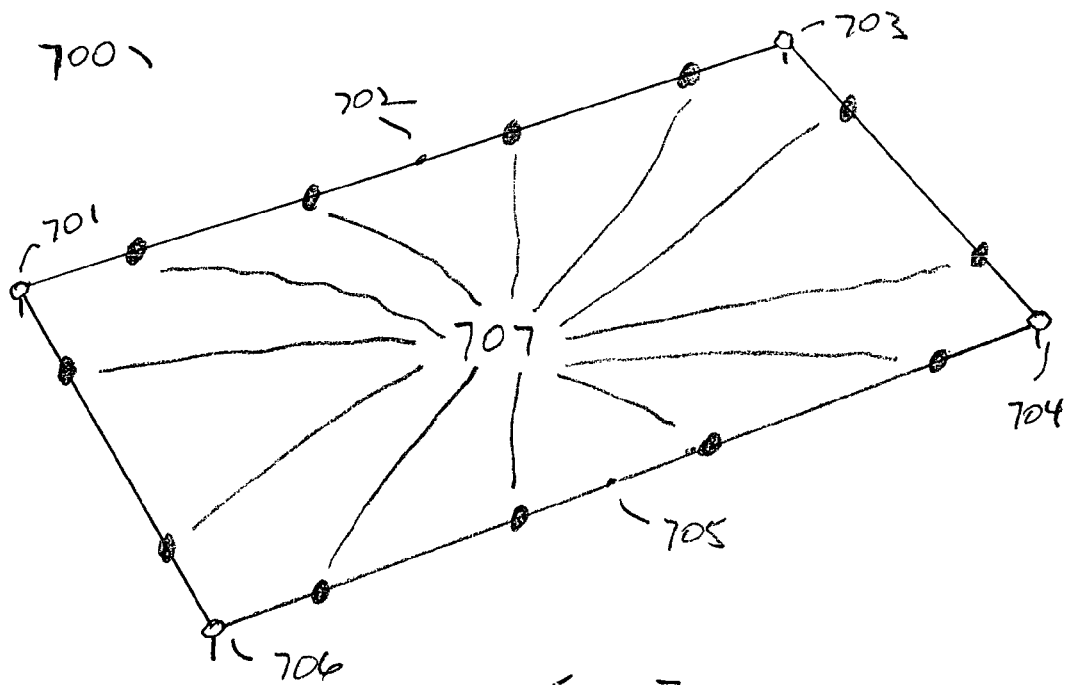


FIG. 7

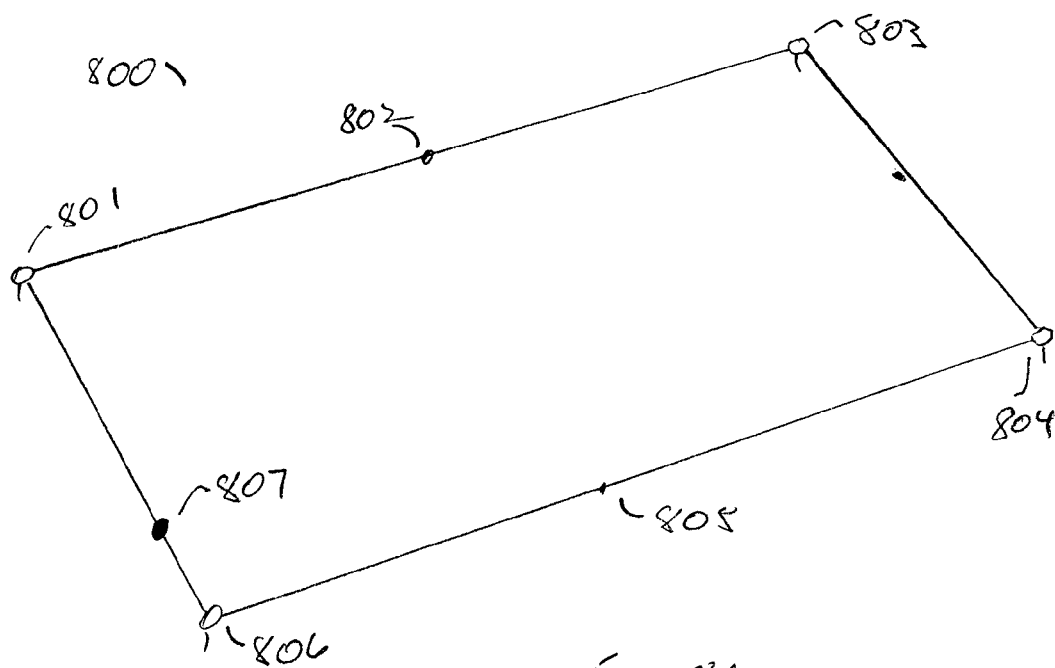


FIG. 8A

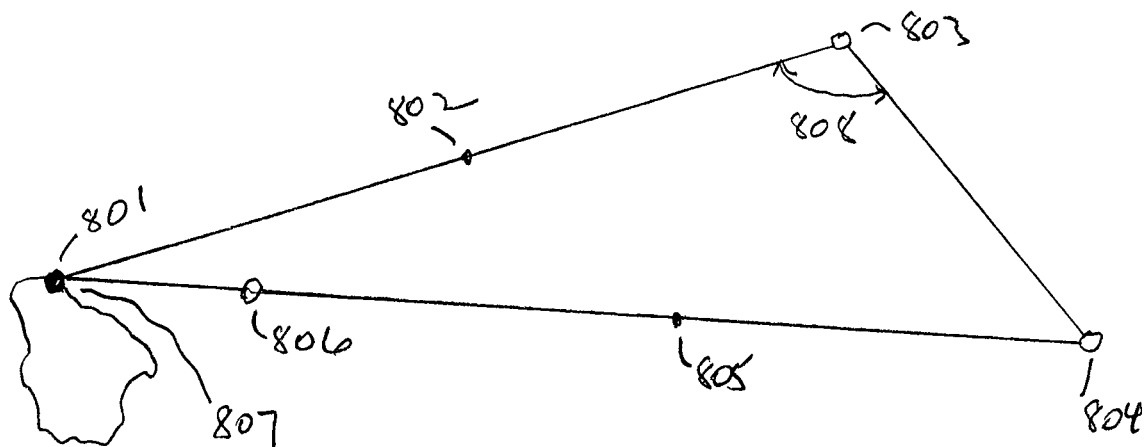


FIG. 8B

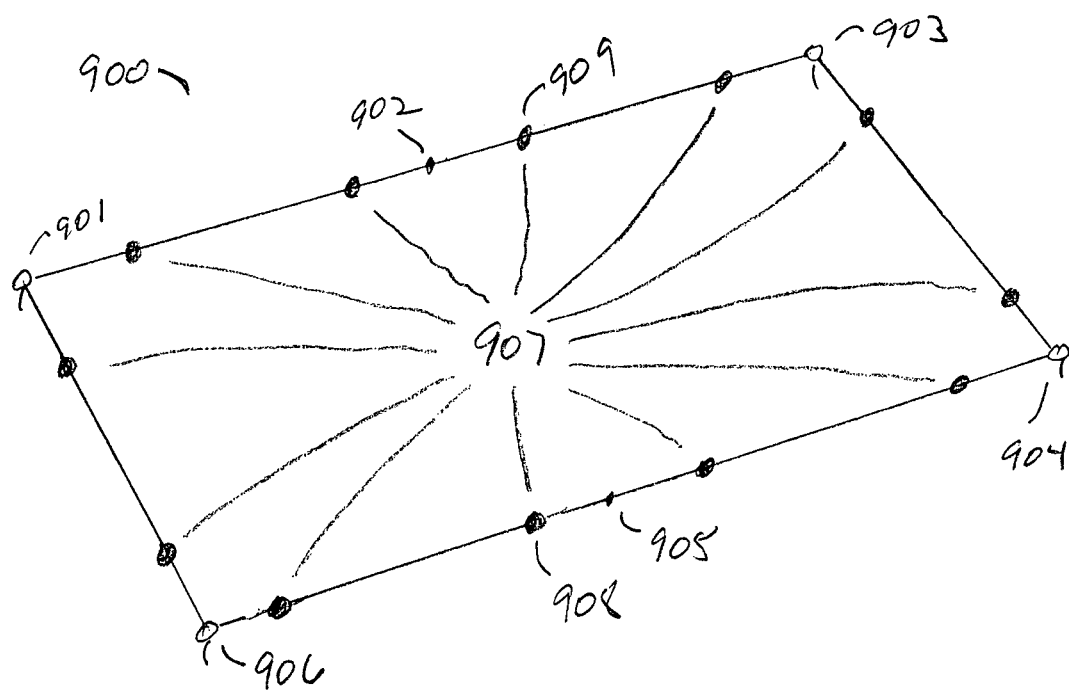


FIG. 9A

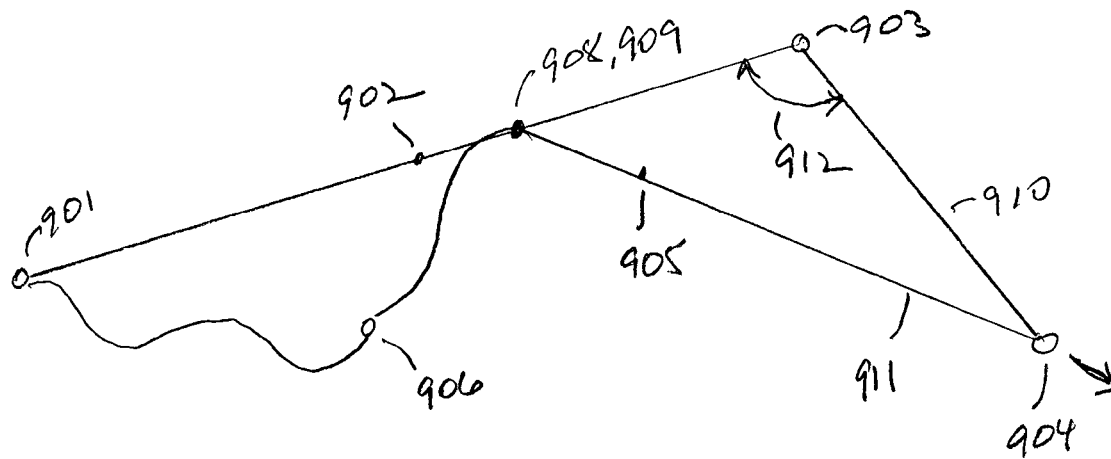


FIG. 9B

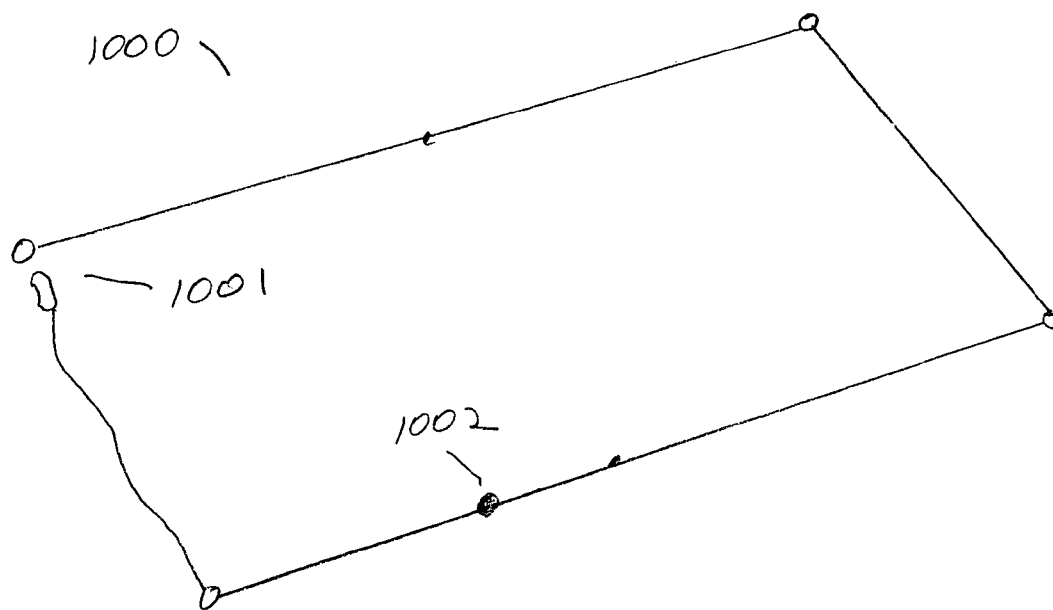


FIG. 10

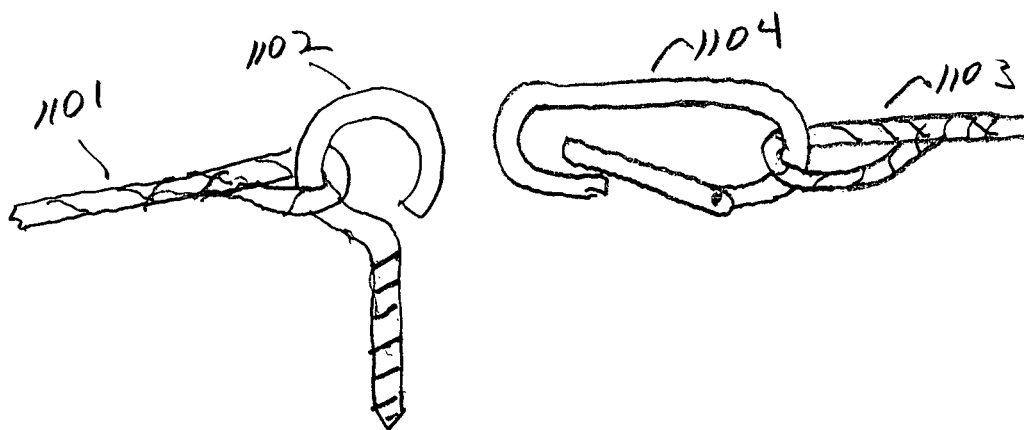


FIG. 11A

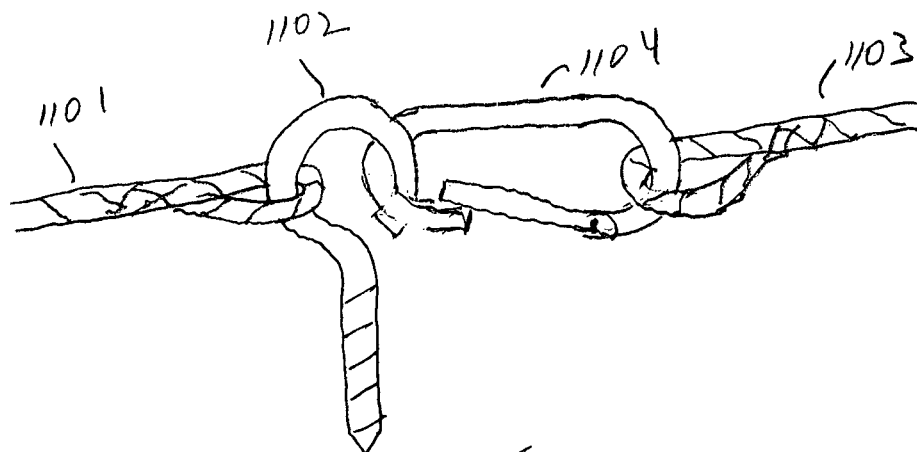
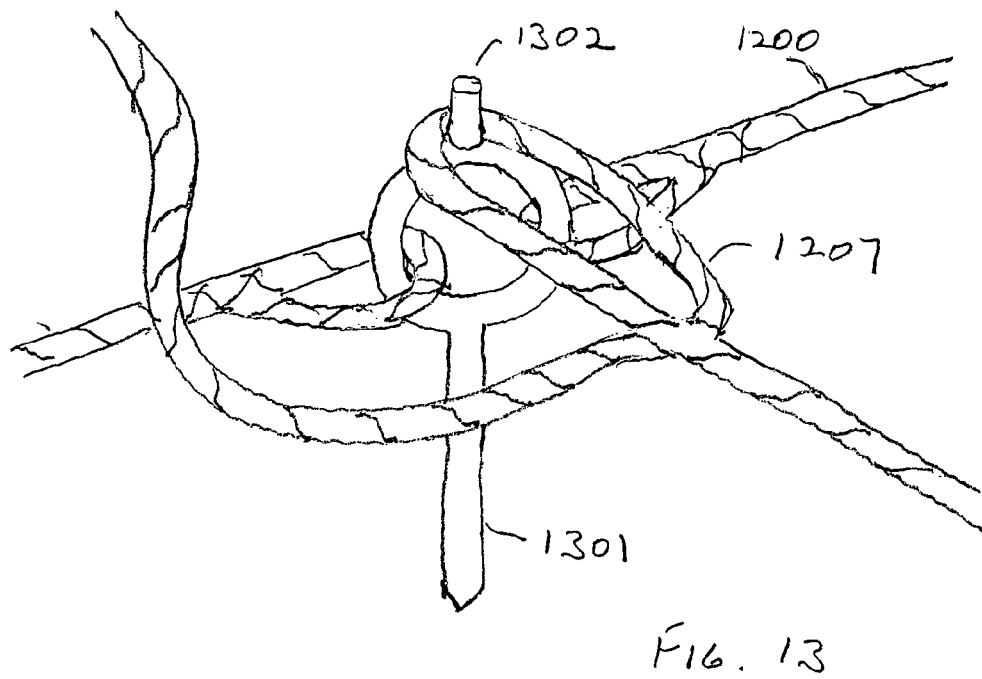
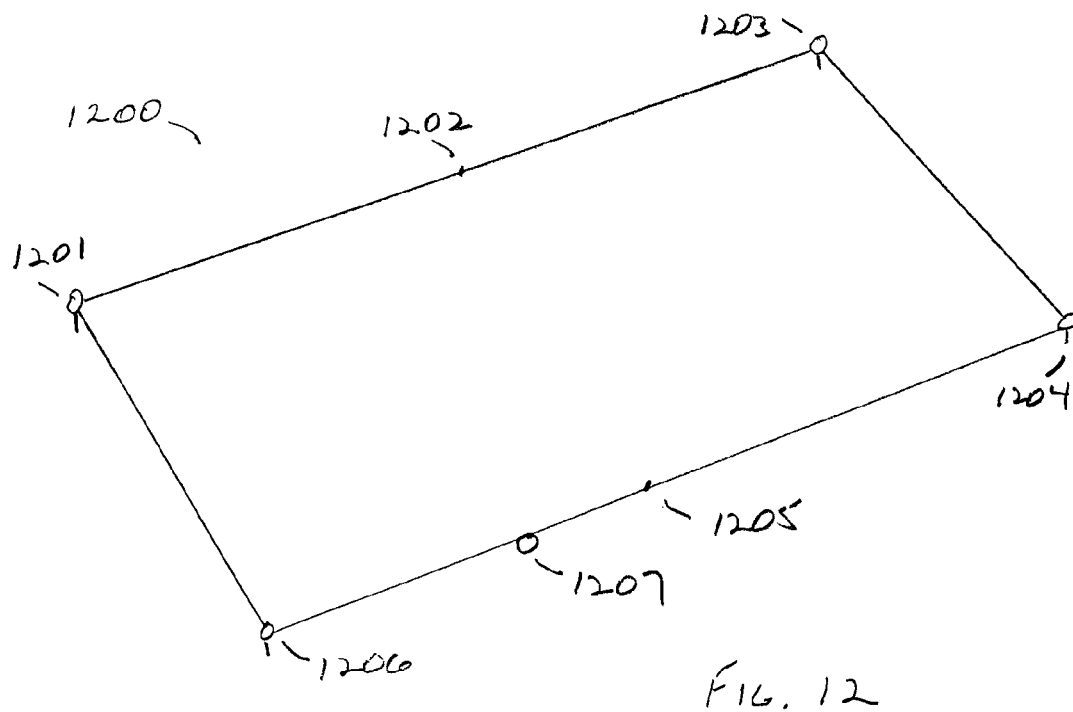
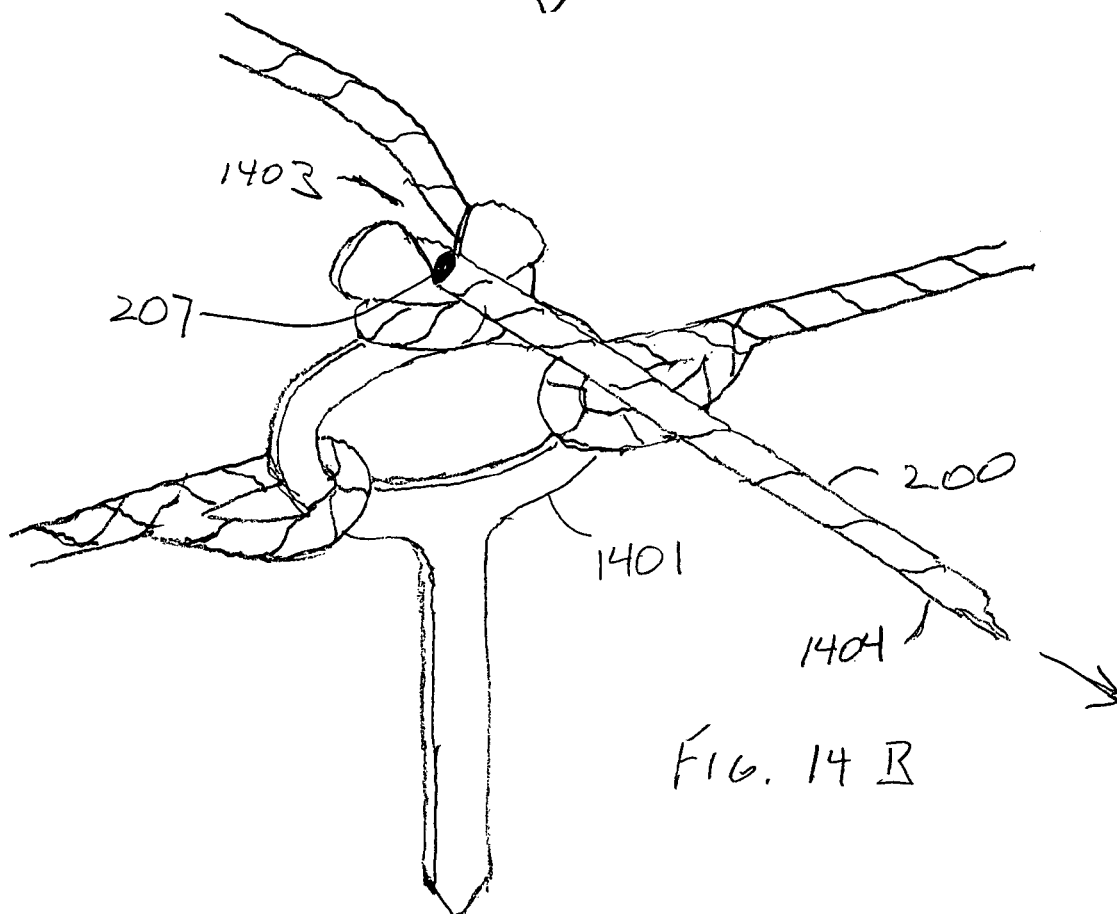
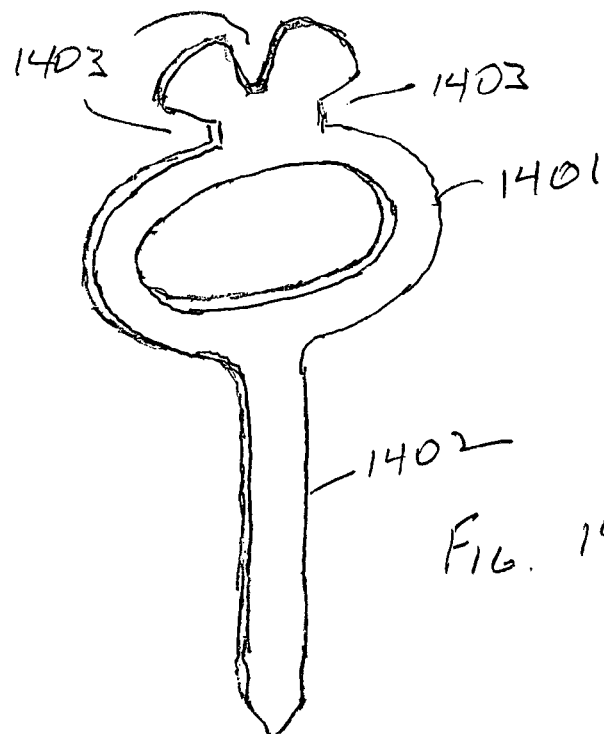


FIG. 11B





1

SPORT COURT PERIMETER BOUNDARY

CROSS REFERENCE TO RELATED APPLICATIONS

This application claims priority from provisional application No. 60/788,268, filed Mar. 31, 2006 and titled "Sport court perimeter boundary". That provisional application is hereby incorporated by reference as if fully reproduced herein.

BACKGROUND

FIG. 1 shows an outdoor volleyball court **100**. The typical court is a rectangular area about 9 meters (29.53 feet) in width by 18 meters (59.06 feet) in length, outlined by perimeter court boundary **101** and bisected by a net **102**. Often, the court perimeter boundary **101** is formed by a flexible rope or tape, anchored to the ground at the corners. The flexible perimeter boundary material aids in play because motion of the boundary when it is hit by a falling ball makes it easy to determine whether a ball has fallen in bounds or out of bounds.

Different volleyball organizations may use somewhat different court sizes. For example, outdoor professional beach volleyball in the United States is often played on a court that is 8x16 meters (26.25 by 52.49 feet).

In any case, the court perimeter boundary **101** should outline a rectangle, each corner forming a right angle. If the figure formed by the perimeter boundary **101** is not an accurate rectangle, for example if the figure is a parallelogram or other shape, the game may be made more difficult or unfair.

SUMMARY OF THE INVENTION

An improved court perimeter boundary for volleyball or other sports comprises at least one indicator that indicates a hypotenuse distance to be used in squaring the court delimited by the boundary, and is separable for easy winding.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 shows a volleyball court.

FIG. 2 shows volleyball court perimeter boundary in accordance with a first example embodiment of the invention.

FIG. 3 shows a first example anchor joining two segments of a court perimeter boundary.

FIG. 4 shows a second example anchor that anchors a corner formed by two perimeter segments.

FIG. 5 shows a third example anchor that anchors a corner formed by two perimeter segments.

FIGS. 6A-6C illustrate the setup of the example perimeter boundary of FIG. 2.

FIG. 7 illustrates a court perimeter boundary in accordance with a second example embodiment of the invention.

FIGS. 8A and 8B illustrate a court perimeter boundary in accordance with a third example embodiment of the invention, and some steps involved in its setup.

FIGS. 9A and 9B illustrate a court perimeter boundary in accordance with a fourth example embodiment of the invention.

FIG. 10 shows a court perimeter boundary in accordance with a fifth example embodiment of the invention.

FIGS. 11A and 11B show an example method of making the perimeter boundary of FIG. 10 separable.

FIG. 12 shows a court perimeter boundary in accordance with a sixth example embodiment of the invention.

2

FIG. 13 shows a hypotenuse indicator loop being attached to an anchor, in accordance with an example embodiment of the invention.

FIG. 14A shows an anchor in accordance with an example embodiment of the invention.

FIG. 14B shows the anchor of FIG. 14A with a perimeter boundary temporarily attached.

DETAILED DESCRIPTION

FIG. 2 shows a court perimeter boundary **200** in accordance with a first example embodiment of the invention. Court perimeter boundary **200** is especially suitable for constructing a volleyball court, but may be suitable for use in other sports, for example badminton. Each perimeter segment is preferably made of an elongate, flexible material, for example nylon rope, woven webbing, or a similar material. Preferably, the material is chosen for good durability and high visibility. The segments may be separate pieces of the boundary material joined at the corners, or each segment may be a portion of a continuous boundary on which corner locations are designated. The segments form four corners **201**, **203**, **204**, **206**. Midpoints **202** and **205** are located at the midpoints of the two long sides of the court. Preferably, anchors are provided for securing the corners of perimeter boundary **200** to the ground. Optionally, anchors may be provided for securing the perimeter boundary to the ground at midpoints **202** and **205** as well.

Any of a number of types of anchors may be used within the scope of the appended claims. FIG. 3 shows a first example anchor **301**, joining two perimeter segments **302** and **303**. In the example of FIG. 3, anchor **301** is a $\frac{5}{16}$ inch (8 mm) eye bolt, approximately 3 inches (75 mm) long. Example perimeter segments **301** and **302** are made of nylon rope and are attached to anchor **301** by braiding. Other attachment methods may be used as well. For example, segments **301** and **302** could be tied to anchor **301**. Anchor **301** may be secured to the ground by simply pushing its threaded portion **304** downward into the ground.

FIG. 4 shows a second example anchor **401** that anchors a corner formed by perimeter segments **402** and **403**. In the example of FIG. 4, perimeter segments **402** and **403** are made of woven nylon webbing. Anchor **401** is a spike to be driven into the ground, and is attached using a rubber tension cord **404** to the corner formed by segments **402** and **403**.

FIG. 5 shows a third example anchor **501** that anchors a corner formed by perimeter segments **502** and **503**. In the example of FIG. 5, perimeter segments **502** and **503** are part of a continuous boundary on which mark **504** indicates the corner. Anchor **501** may be made, for example, of a wire staple of a kind commonly used in landscaping. One of skill in the art will recognize that many other anchoring systems may be used within the scope of the appended claims.

Referring again to FIG. 2, perimeter boundary **200** comprises at least one hypotenuse distance indicator **207** to be used in squaring the court. In this example embodiment, hypotenuse distance indicator **207** is preferably a mark made on boundary **200** using an indelible ink or paint of a color that contrasts with the boundary material. Alternatively, indicator mark **207** may be integrally formed by weaving fibers of a contrasting color into boundary **200**, may be a device crimped or clamped onto boundary **200** at the proper location, or may be formed in some other way.

FIGS. 6A-6C illustrate the setup of perimeter boundary **200**, and the use of hypotenuse distance indicator mark **207**, in accordance with an example embodiment of the invention. In a first step, illustrated in FIG. 6A, corners **201** and **203** and

3

midpoint **202** are secured to the ground, forming an initial side of the rectangular court. Hypotenuse distance indicator mark **207** is on a segment **601** not included between corners **201** and **203**.

In a second step, illustrated in FIG. 6B, adjacent corner **204** is moved to its approximate final location, and hypotenuse distance indicator **207** is held at a preselected point on the initial side. In this example, the preselected point is midpoint **202**. Corner **204** is then pulled until segments **602** and **603** are taut. This portion of the setup can easily be performed by two people, one holding hypotenuse distance indicator **207** at midpoint **202**, and one pulling on corner **204** until segments **602** and **603** are taut. Because the distance from corner **204** to indicator **207** is a hypotenuse distance that is $\sqrt{2}$ times the width of the court, and because the distance from corner **203** to midpoint **202** is the same as the distance from corner **203** to corner **204**, interior angle **604** is a right angle. For example, if perimeter boundary **200** forms a court 9 meters (29.53 feet) in width by 18 meters (59.06 feet) in length, the distance from corner **204** to hypotenuse distance indicator **207** is $9 \times \sqrt{2}$ meters, or 12.728 meters (41.76 feet). Once the right triangle is formed by pulling corner **204** to its proper position, corner **204** is secured to the ground. While the example embodiments describe a court whose length is twice its width, one of skill in the art will easily recognize that the invention may be embodied, with suitable adjustments to the placement of the hypotenuse mark, in courts with different aspect ratios.

FIG. 6C illustrates the final steps in the setup of example perimeter boundary **200**. Corner **206** is pulled until perimeter segments **603** and **605** are taut. Because corner **204** has been placed and anchored in its proper location in relation to corners **201** and **203**, corner **206** is also automatically placed in the proper location to form perimeter boundary **200** into a rectangle. That is, the remaining interior angles **606**, **607**, **608** are also right angles. Corner **206**, and optionally midpoint **205**, may then be secured to the ground.

FIG. 7 illustrates a court perimeter boundary **700** in accordance with a second example embodiment of the invention. Perimeter boundary **700** comprises four corners **701**, **703**, **704**, and **706**, and two side midpoints **702** and **705**. Preferably, each corner and midpoint is fitted with an anchor that will serve equally well as a corner anchor or a midpoint anchor. For example, an anchor of the type illustrated in FIG. 3 could be used. Thus, perimeter boundary **700** comprises six points that could serve as corners of a court. Even if the anchors used at the midpoints are different from the anchors used at the corners, a perimeter boundary in accordance with this example embodiment would have four points that can serve as corners. Perimeter boundary **700** also comprises 12 hypotenuse distance indicators **707**, each placed a hypotenuse distance away from one of the points that can serve as corners. For example, if boundary **700** is to form a court 9×18 meters (29.53 by 59.06 feet), then hypotenuse distance indicator marks **707** may be placed on boundary **700** at 12.728 meters (41.76 feet) from each corner or midpoint, in both directions around the perimeter. Having multiple hypotenuse indicators placed in this way makes completely arbitrary the choice of which boundary segment end to start with in setting up a court. Any two adjacent segments may be used to form the initial long court side, and the segment adjacent either end of that initial side may be used to form the initial right angle. One of hypotenuse distance indicators **707** will always be available to hold near the preselected point on the initial side during the squaring up of the initial right angle.

FIGS. 8A and 8B illustrate a court perimeter boundary **800** in accordance with a third example embodiment of the invention, and some steps involved in its setup. Perimeter boundary

4

800 comprises corners **801**, **803**, **804**, and **806**, and long side midpoints **802** and **805**. Perimeter boundary **800** also comprises a hypotenuse indicator **807**, placed a hypotenuse distance away from corner **804**. In this example embodiment, the distance from corner **804** to hypotenuse distance indicator mark **807** along the boundary is $\sqrt{5}$ times the width of the court, and the court is twice as long as it is wide. For example, if perimeter boundary **800** is to form a court 9×18 meters (29.53 by 59.06 feet), then indicator mark **807** is placed $9 \times \sqrt{5}$ or 20.125 meters (66.03 feet) from corner **804**. As is illustrated in FIG. 8B, during the setup of perimeter boundary **800**, hypotenuse distance indicator **807** is held at corner **801** while corner **804** is pulled into place and anchored, ensuring that angle **808** is a right angle. Corner **806** may then be pulled into place and anchored. Multiple hypotenuse indicators **807** may be placed on perimeter boundary **800** to make arbitrary the choice of the perimeter segment used to begin the setup.

While embodiments have so far been described wherein the preselected point on the initial court side at which the hypotenuse mark is held while squaring the court is the midpoint or an end of the initial side, other preselected points may be used as well. For example, if the hypotenuse distance is $5/4$ times the width of the court, and twelve hypotenuse indicators are made on the perimeter boundary, then each hypotenuse indicator can also serve as the preselected point at which another hypotenuse indicator is held. FIGS. 9A and 9B illustrate court perimeter boundary **900** in accordance with this fourth example embodiment of the invention. Court perimeter boundary **900** comprises corners **901**, **903**, **904**, and **906**, and also side midpoints **902** and **905**. Boundary **900** also comprises 12 hypotenuse distance indicators **907**, each placed a distance of $5/4$ times the width from a corner or midpoint. Two particular hypotenuse distance indicator marks **908** and **909** will be used to illustrate the setup of perimeter boundary **900**. In FIG. 9B, corners **901** and **903** and midpoint **902** have been secured to the ground. Hypotenuse distance indicator mark **908** is placed at indicator mark **909**, and corner **904** is pulled until segments **910** and **911** are taut. Because each of hypotenuse distance indicator marks **908** and **909** is placed $5/4$ of the court width from a corner and the court length is twice the court width, included angle **912** is a right angle. In other words, the preselected point at which hypotenuse distance indicator mark **908** is held during this setup step is itself another hypotenuse distance indicator mark **909**. This symmetry is enabled by the distance from a corner or midpoint to each hypotenuse mark being $5/4$ of the court width and the court length being twice the court width. The rest of the setup proceeds as previously described.

FIG. 10 shows a court perimeter boundary **1000** in accordance with a fifth example embodiment of the invention. Perimeter boundary **1000** comprises a hypotenuse distance indicator **1002**, and is separable at corner **1001**. That is, the segments meeting at corner **1001** may be separated from each other so that perimeter boundary **1000** is open and has two ends rather than forming a closed, endless loop. This arrangement facilitates winding perimeter boundary **1000** for storage, and may ease setup.

FIGS. 11A and 11B show an example method of making perimeter boundary **1000** separable. A first boundary segment **1101** is attached to an anchor **1102**. A second boundary segment **1103** is attached to a clip **1104**. Clip **1104** may be, for example, a snap-gate carabiner, a snap hook, or another kind of openable fastener. In the example of FIG. 11A, boundary segments **1101** and **1103** are made of nylon rope, attached to anchor **1102** and clip **1104** by braiding. Other attachment methods may be used as well. Preferably, the length of the rope forming perimeter segment **1103** is adjusted to account

5

for the length of clip **1104**, such that segment **1103**, including clip **1104**, is the proper length when clip **1104** is engaged with anchor **1102**. In FIG. **11B**, segments **1101** and **1103** have been joined by fastening clip **1104** to anchor **1102**.

FIG. **12** shows a court perimeter boundary **1200** in accordance with a sixth example embodiment of the invention. Perimeter boundary **1200** comprises corners **1201**, **1203**, **1204**, and **1206**, and long side midpoints **1202** and **1205**. Perimeter boundary **1200** also comprises a hypotenuse distance indicator **1207**, placed a hypotenuse distance away from corner **1204**. In this example embodiment, hypotenuse distance indicator **1207** is a loop, and can be held at midpoint **1202** by temporarily attaching it to the anchor at midpoint **1202**. FIG. **13** shows hypotenuse distance indicator loop **1207** being attached to anchor **1301** at midpoint **1202** by simply encircling a feature **1302** of anchor **1301** with hypotenuse distance indicator loop **1207**. In this way, hypotenuse distance indicator **1207** is held at midpoint **1202** without the need for a person to remain at midpoint **1202**. Hypotenuse distance indicator loop **1207** is positioned and sized so that corner **1204** is properly positioned when indicator loop **1207** is attached to midpoint **1202**. This arrangement facilitates the setup of court boundary **1200** by one unassisted person. The unassisted person can place corners **1201** and **1203** and midpoint **1202**, attach hypotenuse distance indicator loop **1207** to anchor **1301**, and then place corner **1204** by drawing the segments adjacent corner **1204** taut.

Alternatively, an anchor may have gripping features to temporarily hold a hypotenuse distance indicator. FIG. **14A** shows an anchor **1401** with gripping features in accordance with an example embodiment of the invention. Anchor **1401** is preferably made of stamped sheet steel, but may be cast, forged, molded from plastic, or formed by some other method. Anchor **1401** comprises a tang **1402** for penetrating the ground, and also comprises notches **1403** sized so that the court boundary material can wedge into them. For example, if the court boundary material is $\frac{3}{8}$ inch diameter nylon rope, notches **1403** may taper to a $\frac{1}{4}$ inch bottom width. A court perimeter boundary as boundary **200** shown in FIG. **2** may be set up by a single unassisted person using anchor **1401** at midpoint **202**. FIG. **14B** shows court perimeter boundary **200** temporarily attached to anchor **1401**. Hypotenuse distance indicator mark **207** is wedged into the top notch **1403**, and the perimeter segment comprising mark **207** is wrapped through the other two notches **1403**. This attachment is secure enough, especially when tension is applied to segment **1404**, to hold hypotenuse distance indicator mark **207** at midpoint **202** until corner **204** is anchored. The boundary may then be easily detached from anchor **1401** so that corner **206** may be placed. For safety, anchor **1401** is preferably made with a low profile and placed at a midpoint of the court, under the net, where it is unlikely to be stepped or fallen on.

Other methods of temporarily attaching a hypotenuse distance indicator are possible. For example, a hypotenuse distance indicator may be a clip or ring fastened to boundary **1200** and that attaches to a preselected point on the initial court side by clipping or snapping, by encircling an anchor feature, or by some other means. Or the hypotenuse distance indicator may attach magnetically to an anchor. A magnet may be embedded in or attached to the perimeter boundary at the hypotenuse distance indicator point, and attach to a ferrous anchor by magnetic attraction. Alternatively, the anchor may be magnetized and the hypotenuse indicator may include metal for attaching to the magnetized anchor. Other attachment methods are possible.

It is intended that the embodiments illustrated above be considered exemplary only and not as defining the scope of

6

the invention, which is to be limited only by the appended claims viewed in light of the prior art.

The invention claimed is:

1. A perimeter boundary for a sport court, comprising:
 - a rectangle having four corners, first and second of the corners being at ends of a first side of the rectangle, the first side including a preselected point; and
 - a hypotenuse distance indicator placed on one of the boundary segments not included between the first and second corners, the hypotenuse distance indicator placed a hypotenuse distance, as measured along the boundary, from a point on the boundary defining a third one of the corners, wherein the hypotenuse distance is the distance between the third corner of the rectangle and the preselected point on the first side;
 - wherein the perimeter boundary is configured to separate so that the perimeter boundary is open and has two ends, and is further configured to reattach when in use so that the perimeter boundary forms a closed, endless loop; and
 - wherein each segment marks a portion of the court perimeter during play of the sport.
2. The perimeter boundary of claim 1, wherein the preselected point is a midpoint of the first side or an end of the first side.
3. The perimeter boundary of claim 1, wherein the hypotenuse distance indicator is configured to temporarily attach to the preselected point.
4. The perimeter boundary of claim 1, wherein the perimeter boundary can be set up by one unassisted person.
5. The perimeter boundary of claim 1, wherein the rectangle has a width and a length longer than the width, and wherein the hypotenuse distance is one of $\sqrt{2}$ times the width, $\sqrt{3}$ times the width, and $5/4$ times the width.
6. A perimeter boundary for a sport court, comprising:
 - at least four elongate flexible segments configured to form a rectangle having four corners; and
 - at least two hypotenuse distance indicators placed on the perimeter boundary, each hypotenuse distance indicator being a hypotenuse distance, as measured along the boundary, from a point on the boundary defining a respective one of the corners, wherein the hypotenuse distance is the distance between the respective corner and a respective preselected point on an initial side of the rectangle;
 - wherein each segment marks a portion of the court perimeter during play of the sport.
7. The perimeter boundary of claim 6, wherein the hypotenuse distance is selected such that any of the hypotenuse distance indicators can also serve as a preselected point.
8. The perimeter boundary of claim 6, wherein any of the corners can serve as an initial corner in setting up the perimeter boundary.
9. The perimeter boundary of claim 6, comprising twelve hypotenuse distance indicators.
10. The perimeter boundary of claim 6, wherein the perimeter boundary is configured to separate so that the perimeter boundary is open and has two ends, and is also configured to reattach for use so that the perimeter boundary forms a closed, endless loop.
11. The perimeter boundary of claim 6 wherein the rectangle has a width and a length longer than the width, and wherein the hypotenuse distance is one of $\sqrt{2}$ times the width, $\sqrt{3}$ times the width, and $5/4$ times the width.
12. The perimeter boundary of claim 6, wherein the perimeter boundary can be set up by one unassisted person.

7

13. A method of setting up a perimeter boundary for a sport court on which a sport is to be played, the method comprising:

obtaining an elongate flexible perimeter boundary that is a loop configured to form a rectangular court having four corners, the perimeter boundary comprising a hypotenuse distance indicator placed on the perimeter boundary a hypotenuse distance away from a point on the perimeter boundary that serves as a third corner of the rectangular court, and wherein the perimeter boundary is configured to separate so that the perimeter boundary is open and has two ends, and is further configured to reattach when in use so that the perimeter boundary forms a closed, endless loop;

anchoring the perimeter boundary to a ground at two points that are first and second corners of the rectangular court, thereby forming an initial side of the rectangular court having the first and second corners at ends of the initial side;

holding the hypotenuse distance indicator at a preselected point on the initial side;

locating a third corner of the rectangular court by pulling a point of the perimeter boundary that will form the third corner until the boundary is taut between the third corner and the second corner and between the third corner and the preselected point at which the hypotenuse distance indicator is held, the positions of the preselected point and the hypotenuse distance indicator constraining a segment of the boundary between the initial side and the third corner to form a right angle with the initial side;

8

anchoring the perimeter boundary at the third corner; and after setup of the sport court perimeter boundary is complete, leaving the perimeter boundary in place to mark the court perimeter during play of the sport, each segment marking a portion of the court perimeter.

14. The method of claim **13**, further comprising:

locating a fourth corner of the rectangular court by pulling the point of the perimeter boundary that will form the fourth corner until the boundary material is taut between the fourth corner and the first corner, and between the fourth corner and the third corner; and anchoring the fourth corner.

15. The method of claim **14**, wherein the rectangular court has two short sides and two long sides, each long side comprising a midpoint, and wherein the method further comprises anchoring the midpoints of the long sides to the ground.

16. The method of claim **13**, wherein the preselected point at which the hypotenuse distance indicator is held is the first corner.

17. The method of claim **13** wherein the preselected point at which the hypotenuse distance indicator is held is a midpoint of the first side.

18. The method of claim **13**, wherein holding the hypotenuse distance indicator at the preselected point further comprises temporarily attaching the hypotenuse distance indicator to the boundary at the preselected point.

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